Contribution ID: **93** Type: **Workshop**

A near real-time spatial monitoring and forecasting of wind energy using geospatial big data

Sunday, 30 November 2025 13:30 (1h 30m)

This workshop will focus on the integration of geospatial datasets, and deep learning algorithms for real-time monitoring and forecasting of offshore wind energy. The session will cover the framework for data retrieval, pre-processing, integration of remotely sensed datasets and the development of predictive models to optimize wind turbine performance. After developing the predictive models, we will integrate climate scenarios to forecast the state of wind in real-time monitoring and near-future prediction. Participants will learn how to integrate cutting-edge geospatial, and meteorological datasets with deep learning algorithms to predict energy production. The workshop will provide valuable insights for renewable energy-related professionals and stakeholders on how geospatia

The global demand for renewable energy, particularly wind energy, is escalating due to the urgent need to combat climate change and decrease reliance on fossil fuels. The study aims to develop a system using geospatial data and deep learning techniques for monitoring and forecasting wind energy. The study seeks to answer three key questions: (i) to develop a framework for integrating and processing geospatial big data for wind energy monitoring. (ii) implement a near-real-time data acquisition pipeline for continuous monitoring, and (iii) develop a predictive model using deep learning algorithms and statistical methods. The use of geospatial and meteorological datasets, turbine performance data (wind speed and direction, theoretical power and active power) and Recurring Neural Network -Long Short-Term Memory will enable near-real-time monitoring and prediction of wind energy. The model performance will be evaluated using statistical indicators like stability tests and forecast accuracy metrics like MAE and RMSE, to measure its stability under different conditions. The proposed model will be used to provide accurate wind patterns and energy potential insights, thereby optimizing wind turbine performance and energy production through the integration of various datasets. The study's results will enhance wind energy predictions, aid in better grid planning, decrease fossil fuel reliance, and enhance grid stability.

Keywords: Deep Learning, geospatial Big data, remote Sensing, wind energy

Presenting Author

Email

Student or Postdoc?

Institute

Registered for the conference?

CHPC User

CHPC Research Programme

Workshop Duration

Half-day

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Session Classification: Workshop